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TUNNELING SENSOR WITH LINEAR FORCE REBALANCE AND
METHOD FOR FABRICATING THE SAME

ABSTRACT

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A tunneling sensor ~~is disclosed~~ ^{has} a pair of force
rebalance capacitors that are used in a push-pull relationship so
as to provide a rebalance force that is a linear function of
applied rebalance voltages, which leads to an output voltage that
is linearly related to input acceleration. The tunneling sensor
comprises a plate electrode that is formed from and attached to a
silicon substrate by a pair of torsional flexures, which provide
an axis of rotation for the plate electrode. A pendulous mass is
formed on a first end of the plate electrode, and a tunnel-effect
contact is formed on a second end of the plate electrode. A pair
of torque rebalance bridge electrodes are formed on the substrate
so as to span the plate electrode. A tunnel-effect tip is formed
on the substrate so as to be proximate the tunnel-effect contact
and in line with the rotational path that the tunnel-effect
contact takes when the plate electrode is rotated.